Remarks

I. Status of claims

Claims 1-21 are pending.

Claim 3 has been rewritten in independent form, including all of the elements of the claims from which it depended. Claim 3 has the same scope that is had in its originally filed dependent form.

II. Claim rejections

The Examiner has rejected claims 1-21 under 35 U.S.C. § 102(b) over Goldenberg ("Automatic layout of variable-content print data").

A. Independent claim 1

Claim 1 has been amended and now recites:

> 1. A method producing a layout of objects on a page, comprising:
>
> generating different tree structures each having at least one node and at least one leaf, wherein each node corresponds to a respective partition of the space and each leaf defines a relative location of a respective one of the objects on the page;
>
> for each of the tree structures, characterizing a respective bounding box for each node in the tree structure, wherein each bounding box includes all of the objects in any subtree below the respective node;
>
> for each of the tree structures, assigning regions within the space for each node in the tree structure in accordance with the respective bounding box associated with the node;
>
> for each of the tree structures, determining a respective score that comprises a measure of available space on the page that is unoccupied by the objects arranged on the page in accordance with partitions of the page defined by the tree structure;
>
> selecting one of the tree structures based on the determined scores; and

producing a layout of the objects on the page based on the selected tree structure.

Goldenberg does not disclose "for each of the tree structures, determining a respective score that comprises a measure of available space on the page that is unoccupied by the objects arranged on the page in accordance with partitions of the page defined by the tree structure," as now recited in claim 1. To the contrary, the floorplan layouts are evaluated independently of the area on which the modules are to be placed (see, e.g., page 11, § 3.2.1, second ¶).

In accordance with Goldenberg's teachings, the floorplan layouts are evaluated using a cost function that is designed to select "the floorplan layout with the smallest area and the shortest wiring necessary given a list of modules to be placed (equivalent to finding the most space-efficient layout of a given set of print objects)" (page 11, § 3.2.1, second ¶).

- One cost function is described on page 16, § 3.2.2.3. This cost function is defined as follows:

$$\text{cost} = A + \lambda W$$

where A is the floorplan area, W is the total wiring length, and λ is a constant).

- Another cost function is described on page 30, § 6.2.1, where the cost function measures "the area of the smallest rectangle *of the desired proportions* that could contain the layout produced."
- Yet another cost function is described on page 32, § 6.2.3. This cost function is defined as follows:

$$\text{cost} = A + \lambda W + kP$$

where A is the floorplan area, W is the total wiring length, λ is a constant, k is a user-specified weight, and P is a penalty term that is calculated as the difference in area between the layout itself and the smallest rectangle within the specified range of aspect ratios that could contain the layout. It should be appreciated that the difference in area between the layout itself and the smallest rectangle within the specified range of aspect ratios that could contain the layout does not constitute "a measure of

available space on the page that is unoccupied by the objects arranged on the page in accordance with partitions of the page defined by the tree structure." Indeed, this difference is calculated without any reference whatsoever to the available unoccupied space on the page.

None of the cost functions disclosed in Goldenberg comprises "a measure of available space on the page that is unoccupied by the objects arranged on the page in accordance with partitions of the page defined by the tree structure," as now recited in claim 1. To the contrary, each of the disclosed cost functions is independent of the area on which the modules are to be placed (see, e.g., page 11, § 3.2.1, second ¶).

For at least these reasons, the rejection of claim 1 under 35 U.S.C. § 102(b) over Goldenberg now should be withdrawn.

B. Dependent claims 2, 4, 6, and 7

Each of claims 2, 4, 6, and 7 incorporates the elements of independent claim 1 and therefore is patentable over Goldenberg for at least the same reasons explained above.

C. Independent claim 3

Claim 3 has been rewritten in independent form, including all of the elements of the base claims from which it depends, as follows:

> 3. A method for locating objects by assembling a layout of objects within a space, comprising:
>
> generating a tree structure having at least one node and at least one leaf, where each leaf corresponds to one object;
>
> characterizing a bounding box for each node in the tree structure, wherein a bounding box for each node includes all objects in any subtree below the node, each object has a fixed aspect ratio and a relative area proportion associated therewith, and said characterizing comprises
>
> establishing a relative area proportion and aspect ratio for each node as a function of relative area proportions and aspect ratios of children of the node, and

> adjusting relative area proportions of at least one child of each node and all children thereof so that predetermined dimensions of the children are equal, performed prior to said establishing; and
>
> assigning regions within the space for each node in the tree structure in accordance with the bounding box associated with the node.

In support of the rejection of claim 3, the Examiner has stated that (see page 3, second ¶ of the Office action):

> Regarding claims 3, 10, and 17, Goldenberg teaches adjusting relative area proportions of at least one child of each node and all children thereof so that predetermined dimensions of the children are equal, performed prior to said establishing (section 6.2.3 "Allowing relaxation of the aspect ratio constraints").

Contrary to the Examiner's statement, however, Goldenberg does not disclose "adjusting relative area proportions of at least one child of each node and all children thereof so that predetermined dimensions of the children are equal." Instead, in accordance with Goldenberg's approach, the areas of the modules are fixed (see, e.g., page 11, § 3.2.1: "For each module, the area (A), upper and lower bounds for aspect ratio (r and s), and connection strength to each other module (which represents the wiring density between pairs of modules) are pre-specified.").

In § 6.2.3, Goldenberg discloses a modification to the cost evaluation function that includes a weighted penalty term. This section, however, does not disclose anything about "adjusting relative area proportions of at least one child of each node and all children thereof so that predetermined dimensions of the children are equal," as recited in claim 3.

For at least these reasons, the rejection of claim 3 under 35 U.S.C. § 102(b) over Goldenberg should be withdrawn.

D. Dependent claim 5

Claim 5 incorporates the elements of independent claim 3 and therefore is patentable over Goldenberg for at least the same reasons explained above.

E. Independent claim 8

Independent claim 8 has been amended and now recites:

> 8. A method of producing a layout of fixed aspect ratio objects on a page, comprising:
>
> generating a binary tree structure comprising
>
> a plurality of leaves, wherein each of the leaves corresponds to a respective one of the objects, and
>
> a plurality of nodes including a root node, wherein each of the nodes corresponds to a respective partition of the page;
>
> for each of the nodes in the binary tree structure, determining a respective aspect ratio and a respective area of a respective bounding box containing all bounding boxes respectively determined for all nodes and leaves branching from the node; and
>
> producing a layout of the objects on the page based on the bounding box determined for the root node.

In support of the rejection of claim 8, the Examiner has stated that (see page 2, § 4, second paragraph):

> Regarding claims 1, 8, and 15, Goldenberg teaches a method for locating objects by assembling a layout of objects within a space (layout print objects in a space, section 3 "The program", page 11), comprising: generating a tree structure having at least one node and at least one leaf (slicing tree in Fig. 2, section 3.2.1), where each leaf corresponds to one object (print object); characterizing a bounding box for each node in the tree structure (layout space reserved for a given tree), wherein a bounding box for each node includes all objects in any subtree below the node; and assigning regions within the space for each node in the tree structure in accordance with the bounding box associated with the node (assigning layout regions for each objects) (Fig. 14, page 26).

Contrary to the Examiner's statement, however, Goldenberg does not disclose "for each of the nodes in the binary tree structure determining a respective aspect ratio and a respective

area of a respective bounding box containing all bounding boxes respectively determined for all nodes and leaves branching from the node," as now recited in claim 8. Instead, in the situation where the aspect ratios of the modules are fixed, all of the dimensions of the modules are predetermined because each module has a fixed area (see page 11, § 3.2.1, second paragraph). In this situation, Goldenberg only discloses that the sizes of the containing rectangles into which the modules respectively fit are determined (see page 12, § 3.2.2.1); Goldenberg does not even hint that containing rectangles are determined for the intermediate nodes of the slicing trees.

For at least these reasons, the rejection of claim 3 under 35 U.S.C. § 102(b) over Goldenberg should be withdrawn.

F. Dependent claims 9-14

Each of claims 9-14 incorporates the elements of independent claim 8 and therefore is patentable over Goldenberg for at least the same reasons explained above.

Claims 10 and 12 also are patentable over Goldenberg for the same reason explained above in connection with claim 3.

G. Independent claim 15

Independent claim 15 recites elements that essentially track the pertinent elements of claim 8 discussed above. Therefore, claim 15 is patentable over Goldenberg for at least the same reasons explained above in connection with claim 8.

H. Dependent claims 16-21

Each of claims 16-21 incorporates the elements of independent claim 15 and therefore is patentable over Goldenberg for at least the same reasons explained above.

Claims 17 and 19 also are patentable over Goldenberg for the same reason explained above in connection with claim 3.

III. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 08-2025.

Respectfully submitted,

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